the entire volume of "egg sea-water." The presence of eggs at the bottom of the bottle makes impossible the thorough mixing which should precede the taking of a sample.

Sea-water which has stood over eggs in shallow beakers exposed to the air always gives much lower values for oxygen content than ordinary sea-water at the same temperature. The difference is of the same order of magnitude as the amount of oxygen used by the eggs in an hour. But it is not due to oxygen consumption, for the "egg sea-water" may be siphoned off and allowed to remain several hours in contact with air, so that equilibrium is certainly established. The difference is of course in part due to the iodine absorption of "egg sea-water," but not wholly so. For if we test a representative sample and obtain the necessary correction for iodine absorption, a difference still remains. If we assume that our method is accurate, we are led to the conclusion that the solubility of oxygen in sea-water is lowered by some substance or substances secreted by, or dissolved away from the eggs. This is not at all unusual, if we remember that Findlay and his collaborators have shown that many colloidal substances exert a well-marked influence on the solubility of gases.[5] Granted that our conclusion is correct, no method of measuring oxidations that depends on a change of oxygen tension (*e. g.*, the Warburg-Siebeck method[6]) is accurate. For any such method assumes that the oxygen solubility of the sea-water remains constant.

Another method of making determinations was devised in the summer of 1914. It was found that the iodine-absorbing substances normally given off by *Arbacia* eggs are colloidal. They do not diffuse through celloidin or parchment membranes. In the measurement of egg oxidations, therefore, the eggs may be enclosed in celloidin tubes instead of being allowed to lie free in the sea-water. Tubes of about 10 c.c. capacity and of narrow bore fit nicely into 300 c.c. bottles. At the conclusion of an experiment, the tube containing eggs is taken out, the bottle is filled to the top with sea-water of known oxygen content and is tested for oxygen by the Winkler method. The use of the celloidin tube has another advantage, in that oxygen determinations may be made in the same bottle in which the eggs were kept. Thus, siphoning is unnecessary and there is no error from this source. The tube method is, however, open to the objection that in the case of sea-urchin eggs at least, development can not take place if the eggs are too closely packed. Without modification it can therefore not be used for the measurement of oxidations during cleavage.

Determinations have been made both by this tube method and by adding corrections for iodine absorption. The results gained so far are not sufficiently accurate to warrant publication. They do show, however, that partial or complete cytolysis produced by dilute sea-water causes not an increase, but a decrease of oxidations.[7]

L. V. Heilbrunn

Woods Hole, Mass.,
July 26, 1915

[5] *Jour. Chem. Soc. Trans.*, XCVII., 536, 1910; CI., 1,459, 1912; CIII., 636, 1913; CV., 291, 1914.

[6] O. Warburg, *Zeit. f. physiol. Chemie*, XCII., 231, 1914.

[7] The tube method can not be used for completely cytolyzed eggs, as the egg pigment wanders through the walls of the celloidin tubes.

A BACTERIAL DISEASE OF WESTERN WHEAT-GRASS. FIRST ACCOUNT OF THE OCCURRENCE OF A NEW TYPE OF BACTERIAL DISEASE IN AMERICA

A very unusual type of bacterial disease has been found occurring on western wheat-grass, *Agropyron smithii* Rydb., in the Salt Lake Valley, Utah, and has been given considerable study by the writer during the current season. Although affected plants are usually somewhat dwarfed, the most striking characteristic of the disease is the presence of enormous masses of surface bacteria which form a lemon-yellow ooze or slime. Sometimes this bacterial slime appears in small droplets, but very often it is spread over the surface of the upper portion of the plant including the sheath, upper internode and inflorescence. The glumes which are badly attacked reveal bacterial layers of slime

between them. Sections of the spikelets show that the floral organs are extensively occupied by the bacterial organism which may be found filling the spaces between them. The disease seems to be that of the upper portion of the plant and has not been found on the roots or lower internodes and sheaths. There is produced a premature drying and bleaching of all the parts of the plant covered by the bacterial ooze. When the bacterial slime hardens it may be separated from the plant surface in the form of thin, lemon-yellow flakes.

At room temperature (25° C. ±) the organism grows very slowly on nutrient neutral agar. Plates that were thickly sown did not begin to show growth until the eighth day, while very thinly sown plates produced no bacterial colonies. However, the organism grows promptly on cooked potato, producing a viscid, lemon-yellow growth at the end of about the sixth day, but growth is apparent by the end of the second day. Organisms taken from a two-day cooked potato culture and stained with carbol-fuchsin, are about twice as long as broad and occur singly or in pairs joined end to end. A white organism which grows readily in agar is frequently found associated with the yellow organism.

This disease of western wheat-grass has many characteristics in common with Ráthay's disease of orchard grass (*Dactylis glomerata,* L.) caused by *Aplanobacter ráthayi,* E. F. S., and described by Ráthay[1] and later by Smith.[2]

First: The characteristic viscid, lemon-yellow slime forming layers over the uppermost leaves, the upper internodes and the different parts of the inflorescence is common in both dieases.

Second: The injury to the plants is due to the bacterial growth which first develops conspicuously on the surface and only later penetrates into the interior.

Third: The bacterial organism in both diseases produces a characteristic lemon-yellow growth.

Fourth: The best growth is made upon cooked potato; growth on agar is very slow and unless the organism is thickly sown growth does not readily take place.

Fifth: A white organism which readily grows on agar is frequently associated with the yellow organism in both diseases.

An extended study of the disease and the causative organism is in progress and the results will be published later.

P. J. O'GARA

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July 13, 1915

1 Ráthay, Emerich, "Ueber eine Bakteriose von *Dactylis glomerata* L.," *Sitzber. der Wiener Akad.,* 1 Abth., Bd. CVIII., pp. 597–602, 1889.

2 Smith, Erwin F., "A New Type of Bacterial Disease," SCIENCE, N. S., Vol. XXXVIII., No. 991, Dec. 26, 1913. "Bacteria in Relation to Plant Diseases," Vol. III., August 4, 1914.

REPORT OF THE SAN FRANCISCO MEETINGS OF SECTION F OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE opening session was held on Monday morning, August second, in San Francisco, in joint meeting with all other sections to listen to addresses of welcome and the address of the president of the Pacific Coast Division of the American Association for the Advancement of Science, Dr. W. W. Campbell.

In the afternoon, the Section adjourned to the University of California, Berkeley, where, in conjunction with the American Society of Naturalists and the American Society of Zoologists, the following papers were read.

On Wednesday, August 4, the affiliated societies made an excursion to Stanford University, at Palo Alto, and in the afternoon held a joint session with the American Genetic Association and the Eugenics Research Association.

The program for the San Francisco meetings was arranged by the following committee:

COMMITTEE ON PROGRAM

Charles A. Kofoid, chairman, University of California; Barton W. Evermann, California Academy of Sciences, San Francisco; C. H. Gilbert, Stanford University; Joseph Grinnell, University of California; S. J. Holmes, University of California; Vernon L. Kellogg, Stanford University; William E. Ritter, University of California; Harry Beal Torrey, Reed College, Portland.

JOHN F. BOVARD,
Acting Secretary for Section F